DOCUMENT RESUME

ED 405 695 EC 305 405

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| TITLE | A Decision-Making Framework for Description of Innovative Education Programs. |
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| SPONS AGENCY | Special Education Programs (ED/OSERS), Washington, DC. |
| PUB DATE | Mar 90 |
| NOTE | 46p.; In: Designing and Evaluating School Learning Environments for Effective Mainstreaming of Special Education Students: Synthesis, Validation, and Dissemination of Research Methods. Final Report; see EC 305 400. |
| PUB TYPE | Reports - Descriptive (141) |
| EDRS PRICE | MF01/PC02 Plus Postage. |
| DESCRIPTORS | *Decision Making; Delphi Technique; *Educational Innovation; Educational Objectives; Elementary Secondary Education; *Learning Processes; Models; Performance Factors; Program Descriptions; Program Development; Program Effectiveness; *Special Needs Students |

ABSTRACT

In this study, a programmatic decision-making framework called the consensus marker-outcome variable system (CMOVS) was developed as a result of a comprehensive "meta-review" and synthesis of research on variables considered by experts to be important to learning for all students, including those with special needs or those at risk of failing. The CMOVS systematically analyzes program design and implementation features, assesses them in relation to site-specific needs, and provides a basis for calculating informational indexes. The information derived from the CMOVS can then be used to assist stakeholders in programmatic decision making. The first section of the paper provides an overview of the CMOVS framework, which groups 228 identified variables into 6 categories: (1) state and district variables; (2) out of school contextual variables; (3) school-level variables; (4) student variables; (5) program design variables; and (6) implementation, classroom instruction, and climate variables. The second section focuses on the research base for the design of the decision-making framework including the literature review and a Delphi survey of experts and practitioners. The final section provides detailed sample illustrations of the use of the CMOVS as a conceptual guide for making programming decisions. This section also shows how the CMOVS can be used to develop a Program Effectiveness Index and a Desirability of Implementation Index. Appended are the master list of variables; definitions; consensus from the field; and a CMOVS computer analysis of user ratings of selected, innovative educational practices. (Contains 13 references.) (Autor/DB)

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# A DECISION-MAKING FRAMEWORK FOR DESCRIPTION OF INNOVATIVE EDUCATION PROGRAMS

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The research reported herein was supported in part by the Temple University Center for Research in Human Development and Education and in part by a grant from the Office of Special Education Programs of the U.S. Department of Education. The opinions expressed do not necessarily reflect the position of the OSEP and no official endorsement should be inferred.

EC305405

**Abstract**

A programmatic decision-making framework, the consensus marker-outcome variable system (CMOVS), was developed as a result of a comprehensive "meta-review" and synthesis of research on variables considered by experts to be important to learning. The CMOVS systematically analyzes program design and implementation features, assesses them in relation to site-specific need, and provides a basis for calculating informational indexes. The information derived from the CMOVS can then be used to assist stakeholders in programmatic decision making.

# A DECISION-MAKING FRAMEWORK FOR DESCRIPTION OF INNOVATIVE EDUCATION PROGRAMS

This paper discusses a decision-making framework concerning the design and implementation features of innovative educational practices/ programs. The framework, derived from the findings of a study designed to obtain a consensus on variables that are important to learning (Wang, Walberg, Reynolds, & Rosenfield, 1989), aims to provide a conceptual basis for systematic analysis, description and identification of features and implementation requirements of innovative educational programs for improving instruction and learning in regular classroom settings.

The first section provides an overview of the decision-making framework; the second section focuses on the research base for the design of the decision-making framework; and the final section provides sample illustrations of the use of the CMOVS as a conceptual guide for making programming decisions.

## The Decision-Making Framework

The decision-making framework discussed in this paper, the Consensus Marker-Outcome Variable System (CMOVS), incorporates variables that are considered by professionals as important to learning, based on a recently completed research synthesis study (Wang, 1990). The CMOVS was developed with the goal of providing a common language that can be used by researchers to align concepts and methodologies across studies concerning variables that are important to learning. It also provides a synthesis of research findings that can be used by practitioners and policy makers to improve communication about programs, their features, and their implementation requirements for planning, documentation, and decision-making.

The impetus for the development of the decision-making framework arose out of two specific concerns about the current state of practice. The first is

concern about the quality of education programs in terms of how they respond to increasing diversity among students. The second is concern about the need to develop a systematic information base on how to use what we know works to improve schools' capabilities to achieve the educational vision of providing equity in learning outcomes for all students, including those with special needs and/or those considered to be at risk of failing or dropping out of school.

## Concern for Quality Education

The CMOVS was conceived within the context of rising public concern over the general quality of education, and in particular, the effectiveness of current educational approaches for students with special needs or otherwise considered educationally at risk -- those who require greater-than-usual educational and related service support. This concern for educational effectiveness has been expressed in a multitude of reports by a variety of commissions and study groups (e.g., Carnegie Forum on Education and the Economy, 1986; Committee for Economic Development, 1985; Council of Chief of State School Officers, 1987; Hawkins, 1986; National Coalition of Advocates for Students, 1985; National Governors' Association, 1986). There is a clear mandate to improve the school's ability to effectively and efficiently serve all students, including those who require special education or other remedial or compensatory programs, as well as those otherwise considered to be at risk of either failing or dropping out of school.

## The Need to Build a Systematic Information Base

While there have been major efforts toward reform, current practices fall woefully short of this mandate. There is no lack of information on what to do to improve current practice (cf. Wittrock, 1986; Wang, Reynolds & Walberg, 1987-1989). However, there is a significant lack of systematic information on what we know works and how to use what we know to improve instruction and learning in schools.

Local schools face two demanding tasks: first, obtaining information on the design, implementation requirements, and efficacy of innovative



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approaches/practices; and second, evaluating the feasibility and the site-specific compatibility of the approaches with the objectives of a particular school district and/or school. Findings from a 1983 survey (Research for Better Schools) showed that local educators in New Jersey and Pennsylvania, for example, look to external training and technical assistance programs for staff development and support in three major areas: (a) curriculum and instruction, especially in terms of the implementation of innovative programs and practices, development and improvement of curricula, and in-service staff development for school personnel; (b) administration, including organizational planning, staffing and scheduling, facilities maintenance, and management skills, such as instructional leadership and communication; and (c) knowledge about the "outside world," including state and federal regulations and community relations.

Presently, there are few tools available to assist local schools/school districts in selecting approaches/practices for meeting their specific needs. This lack has resulted in a limited ability of school personnel to make informed decisions in selecting practices/programs, that is, how such decisions are aligned with local educational goals, resources, and needs. The CMOVS is intended to provide a systematic framework for guiding analysis of program design and implementation features in ways that can be helpful to school personnel and policy makers in developing, identifying, and selecting innovative practices/programs.

### The Development of the Consensus Marker-Outcome Variable System

The variables included in the CMOVS are considered to be both important to learning and, perhaps more significant, "alterable" (educators have some chance of changing them in ways that enhance learning), thereby improving chances for students' learning success. In other words, variables included in the CMOVS are concerned with learning conditions that can bring about educational outcomes for students. Thus, in a real sense the consensus represented in the CMOVS is reflective of the recent shift from the study of "static" variables that are not easily alterable by schools (e.g., sex, age, SES, history of education) to the study of instruction and learning as they take

place under specific environmental conditions.

Specifically, development of the CMOVS was based on the use of contemporary professional literature and expert opinions' to answer the following questions: What aspects of school and instruction enhance student learning? What kinds of social relationships are important to enhance student learning in regular classroom settings? What learner characteristics are important and alterable in improving learning of students with special needs?

In order to specify the well-confirmed knowledge about school learning, the development of the CMOVS began with a comprehensive meta-review and synthesis of research on variables considered to be important to learning. Then, various groups of educational professionals were asked to make judgments about the importance of the identified variables or principals in their work. Thus, the first step involved a detailed reading of the professional literature to make a "first approximation" list of important variables based on a conceptual framework of variables (Wang, 1986) that are important to learning in school contexts. Figure 1 shows a schematic representation of the conceptual framework.

Selection of a corpus of studies for analysis and synthesis

A vast research literature addresses one or more of the potential learning influences represented by the conceptual framework, and it clearly would not be possible to examine all of the thousands of original studies relevant to a synthesis of this scope. Indeed, even the literature of review articles is massive. For this reason we focused on authoritative reviews, handbook chapters (especially those sponsored by the American Educational Research Association and other organizations), selected additional syntheses in government documents and other sources.

A preliminary list of sources was reviewed by the Scientific Advisory Panel, and revised after their recommendations. Following this review, the sources chosen included chapters from the past decade or more of the Review of Research in Education, the Annual Review of Psychology, and the Annual

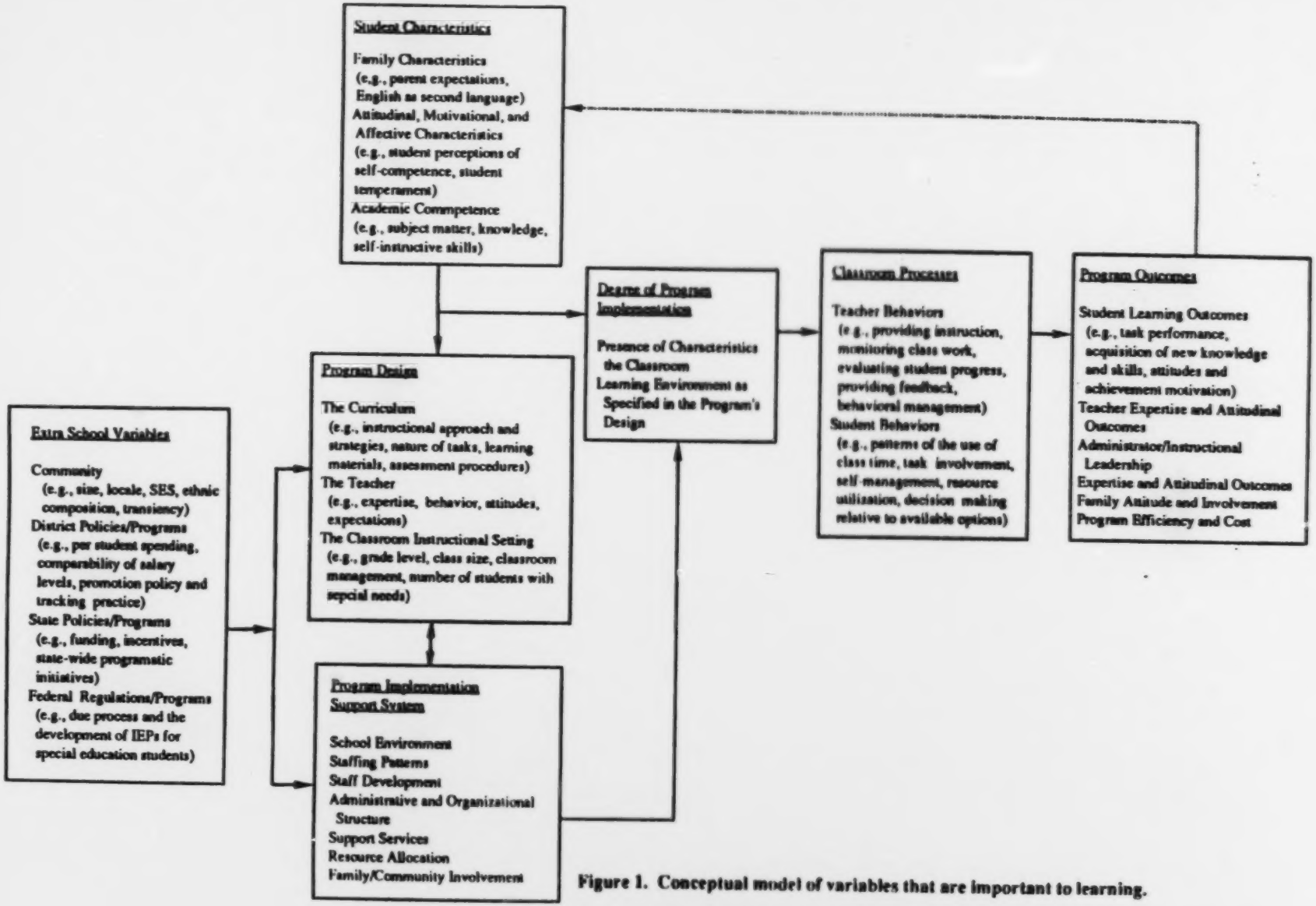
Student Characteristics
Family Characteristics
(e.g., parent expectations, English as second language)
Attitudinal, Motivational, and Affective Characteristics
(e.g., student perceptions of self-competence, student temperament)
Academic Competence
(e.g., subject matter, knowledge, self-instructive skills)
Degree of Program Implementation
Presence of Characteristics the Classroom Learning Environment as Specified in the Program's Design
Classroom Processes
Teacher Behaviors
(e.g., providing instruction, monitoring class work, evaluating student progress, providing feedback, behavioral management)
Student Behaviors
(e.g., patterns of the use of class time, task involvement, self-management, resource utilization, decision making relative to available options)
Program Outcomes
Student Learning Outcomes
(e.g., task performance, acquisition of new knowledge and skills, attitudes and achievement motivation)
Teacher Expertise and Attitudinal Outcomes
Administrator/Instructional Leadership
Expertise and Attitudinal Outcomes
Family Attitude and Involvement
Program Efficiency and Cost
Program Design
The Curriculum
(e.g., instructional approach and strategies, nature of tasks, learning materials, assessment procedures)
The Teacher
(e.g., expertise, behavior, attitudes, expectations)
The Classroom Instructional Setting
(e.g., grade level, class size, classroom management, number of students with sepcial needs)
Extra School Variables
Community
(e.g., size, locale, SES, ethnic composition, transiency)
District Policies/Programs
(e.g., per student spending, comparability of salary levels, promotion policy and tracking practice)
State Policies/Programs
(e.g., funding, incentives, state-wide programatic initiatives)
Federal Regulations/Programs
(e.g., due process and the development of IEPs for special education students)
Program Implementation Support System
School Environment
Staffing Patterns
Staff Development
Administrative and Organizational Structure
Support Services
Resource Allocation
Family/Community Involvement

**Figure 1. Conceptual model of variables that are important to learning.**

**Note: **Variables listed are intended to be illustrative only. They are not intended to reflect a comprehensive analysis for the purposes of the proposed work.**



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Review of Sociology, as well as the Handbook of Research on Teaching (Wittrock, 1986), Designs for Compensatory Education (Williams, Richmond & Mason, 1986), more specialized handbooks, and a small number of journal articles chosen to assure coverage of all the areas addressed in the comprehensive framework. Initially, over 200 articles, chapters, and other sources were identified. All of these sources were read, but some were excluded from the final corpus because they failed to address K-12 instruction in regular school settings, because they addressed exceptionally narrow and atypical learning outcomes, or because they were relevant only to rare or special-learner populations.

A total of 179 sources were included in the final corpus of studies (86 chapters from annual review series, 44 handbook chapters, 20 government and commissioned reports, 18 book chapters, and 11 review articles). All of these were relevant to a range of cognitive and/or affective learning outcomes for K-12 learners in formal educational settings. A list of more than 200 variables was assembled based on the literature reading. A detailed analysis of the literature is included in a paper on variables that are considered important to learning (Wang, Haertel, and Walberg, 1989).

In the next step, the Delphi survey technique was used to survey expert opinions about variables that are considered to be important to learning. A full report of the survey finding is in Wang, Reynolds, Walberg and Rosenfield, (1989). Briefly, a panel of 12 experts was identified for this phase of information gathering. The expert panel included leading researchers as well as outstanding practitioners and editors of professional journals. Using a scale from 1 (low) to 3 (high), the panel was asked to rate the importance of each of the variables in terms of demonstrated importance to student learning. They were also asked to add, delete, and suggest changes on the list of variables. In accordance with Delphi procedures, results of the "first round" of ratings were then sent back to the experts and they responded in a "second round," taking into account what other experts had said in the first round. Responses in both rounds formed the basis for revising the survey instrument, the survey of variables considered important to learning, which was then sent to a broad sample of professionals in order to form the data base for the

development of the CMOVS.

**Findings from a Survey of Consensus from the Field**

To investigate questions about consensus among various educators on alterable variables considered important, eight groups of professionals were identified and asked to respond to the survey of variables considered important to learning. Through the cooperation of the Council for Exceptional Children (CEC) a random sample of 1001 teacher members of CEC was obtained; all are special educators. Of that sample, 449 (45%) responded to the survey. Each of the special education teachers was asked to recruit as an additional respondent the "regular" teacher whose classroom was nearest to his/her own classroom; 182 regular teachers responded.

In addition, a sample of 526 school psychologists was selected randomly from the membership list of the National Association of School Psychologists; 207 responded. Each psychologist was asked to recruit a school principal in a building they served. Fifty school principals responded. All state directors of special education and of Chapter I programs were asked to complete the survey, which they did at relatively high rates: 64% (N = 36) and 58% (N = 40), respectively. A group of special education researchers was identified by assembling names of recipients of federal research grants in the field of special education, specifically relating to services for mildly handicapped students in regular education settings; 55 of 197 responded. A final category of educational researchers/authors was created by assembling names of first authors of 134 major chapters in the professional literature used in the "meta-review" that initiated the development of the CMOVS; 61 (46%) responded.

To determine the extent of agreement among various groups of respondents to the survey on variables considered important to learning, Pearson correlations among the mean ratings of items as determined by the eight educator groups were examined. The results, summarized in Table 1, suggest a very high degree of consensus among such educator groups on variables that are important in attempting to enhance the learning of children in school. It may be noted, for example, that the correlation of mean ratings

**Table 1**

Pearson Correlations of Mean Ratings of 228 Variables by Eight Respondent Groups

| Respondent Groups | ERA | SER | SPs | SPr | SDSE | SDCI | RET | SET |
|---|---|---|---|---|---|---|---|---|
| Educ. Researchers/Authors (ERA) | 1.00 | | | | | | | |
| Special Educ. Researchers (SER) | .91 | 1.00 | | | | | | |
| School Psychologists (SPs) | .88 | .90 | 1.00 | | | | | |
| School Principals (SPr) | .84 | .86 | .93 | 1.00 | | | | |
| St. Dirs. of Special Educ. (SDSE) | .77 | .87 | .89 | .87 | 1.00 | | | |
| St. Dirs. of Ch. I Programs (SDCI) | .81 | .84 | .92 | .92 | .88 | 1.00 | | |
| Regular Educ. Teachers (RET) | .80 | .82 | .92 | .94 | .82 | .89 | 1.00 | |
| Special Educ. Teachers (SET) | .78 | .85 | .95 | .92 | .88 | .89 | .95 | 1.00 |

by regular and special education teachers was .97. Though this was the highest correlation observed, all correlations tended to be high, with the median among 28 correlations being .88. The lowest correlation (.80) was between State Directors of Special Education and Education Researchers/ Authors. Judged by correlational analysis, there is remarkable similarity in the views of special and regular education teachers about principles to be considered in their teaching.

To further analyze the consensus among the eight educator groups, the mean ratings of the items that received the highest and lowest scores in each of the groups were examined. Even though the correlations across groups were high, when considering all 228 items in the survey, it was thought that the top-rated items might be somewhat different among groups. Table 2 displays items that received a mean rating of 2.7 or above, and Table 3 displays ratings below 1.9. Some contrasting patterns in the mean rating by groups are noted. It seems that there is more consensus among the groups on the lowest ranked items (see Table 3). However, some consistent patterns of differences were suggested in the data (see Table 2). For example, the patterns of ratings among principals, regular and special education teachers, and Chapter 1 directors were more similar when compared to those of the researchers. On the other hand, the ratings of special and regular education researchers and state directors of special education were even more alike.

## Discussion of Study Findings

Although conclusions of consensus yield from a synthesis of the research base and the Survey of Consensus from the field, certain caveats should be noted. For example, it cannot be determined from the analyses of the literature what actual effect sizes will result; the analyses merely estimate their relative sizes. In addition, the analyses yield neither actual nor relative estimates of combinations of practices. It would seem reasonable to suppose that implementation of more practices with the highest estimates would yield the largest effects, but this supposition is a matter for subsequent empirical research.

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Table 2
Patterns of Differences in Mean
Ratings at or Above 2.7 Among Stakeholder Groups

| Variables with Mean Ratings at or Above 2.7 by Total & Group | Mean Rating by Stakeholder Groups | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | TOTAL (1123) | RER (61) | SER (55) | PSY (207) | PRN (91) | SD (37) | CID (41) | RET (182) | SET (449) |
| Out School Contextual Variables | | | | | | | | | |
| ***Home Environment & Parental Support*** | | | | | | | | | |
| parental involvement in assuring completion of homework | 2.73 | | | | x | | x | x | x |
| parental involvement in assuring attendance | 2.85 | | | x | x | x | x | x | x |
| parental application of discipline | 2.77 | | | x | x | | x | x | x |
| parental interest in student's work | 2.83 | x | x | x | x | x | x | x | x |
| parental expectation for academic success | 2.80 | x | x | x | x | | x | x | x |
| School Level Variables | | | | | | | | | |
| ***Teacher/Administrator Decision Making*** | | | | | | | | | |
| teacher involvement in instructional decision making | 2.75 | | x | x | x | | x | x | x |
| teacher involvement in increasing academic performance | 2.79 | | x | | x | x | x | x | x |
| ***School Culture (Ethos)*** | | | | | | | | | |
| safe, orderly school climate | 2.75 | | | | x | | x | x | x |
| Student Variables | | | | | | | | | |
| ***Social and Behavioral*** | | | | | | | | | |
| positive behavior | 2.80 | | | x | x | | | x | x |
| cooperativeness with teachers | 2.71 | | | | x | | | x | x |
| ***Motivational and Affective*** | | | | | | | | | |
| attitude toward school | 2.85 | | | x | x | | x | x | x |
| attitude toward teachers | 2.77 | | | x | x | | x | x | x |
| motivation for continual learning | 2.82 | | x | x | x | x | x | x | x |
| perseverance on learning tasks | 2.76 | | | x | x | | x | x | x |
| self confidence | 2.79 | | x | x | x | x | x | x | x |
| ***Cognitive*** | | | | | | | | | |
| level of reading comprehension ability | 2.79 | x | x | x | x | x | x | x | x |
| level of listening skills | 2.76 | x | | x | x | | x | x | x |

Note: RER - regular ed. researcher SD - state director
SER - special ed. researcher CID - chapter 1 director
PSY - psychologist RET - regular ed. teacher
PRN - principal SET - special ed. teacher



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Table 2

(continued)

| Variables with Mean Ratings at or Above 2.7 by Total & Group | Mean Rating by Stakeholder Groups | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | TOTAL (1123) | RER (61) | SER (55) | PSY (207) | PRN (91) | SD (37) | CID (41) | RET (182) | SED (449) |
| ***Meta Cognitive Variables*** | | | | | | | | | |
| self-regulatory, self-control strategies | 2.78 | | | x | x | | | x | x |
| <u>Implementation, Classroom Instruction, & Climate Variables</u> | | | | | | | | | |
| ***Classroom Implementation Support*** | | | | | | | | | |
| establish efficient classroom routines and communication | 2.70 | | | | | | | x | x |
| ***Classroom Instruction*** | | | | | | | | | |
| use of clear instruction | 2.73 | | x | | | | | x | x |
| teacher conveys enthusiasm | 2.76 | | | x | x | | | x | x |
| providing frequent feedback | 2.81 | | x | x | x | x | x | x | x |
| teaching for understanding | 2.77 | | | x | x | | x | x | x |
| good examples and analogies | 2.71 | | | | | | | x | x |
| ***Quantity of Instruction*** | | | | | | | | | |
| time on task | 2.80 | x | x | x | x | x | x | x | x |
| time on reading skills | 2.70 | | x | x | x | x | | x | x |
| ***Classroom Management*** | | | | | | | | | |
| teacher "withitness" (awareness) | 2.75 | | | x | x | | x | x | x |
| ***Student and Teacher Interactions (social)*** | | | | | | | | | |
| teacher reacts appropriately | 2.75 | | | x | x | | x | x | x |
| ***Classroom Climate*** | | | | | | | | | |
| task difficulty | 2.74 | | | x | x | | x | x | x |
| low apathy | 2.70 | | | x | x | | | x | x |
| organization | 2.80 | | | x | x | | | x | x |

Table 3
Patterns of Differences in Mean
Ratings at or Below 1.9 Among Stakeholder Groups

| Variables with Mean Ratings at or Below 1.9 by Total & Group | Mean Rating by Stakeholder Groups | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | TOTAL (1123) | RER (61) | SER (55) | PSY (207) | PRN (91) | SD (37) | C1D (41) | RET (182) | SET (449) |
| **State and District Variables** | | | | | | | | | |
| ***District Level Demographics*** | | | | | | | | | |
| school district size | 1.83 | x | x | x | x | x | | x | |
| degree of school district centralization | 1.83 | x | x | x | x | x | x | x | x |
| contractual limits on after school meetings | 1.55 | x | x | x | x | x | x | x | x |
| contractual restrictions on aide activities | 1.83 | x | x | x | x | x | x | | |
| efficiency of transportation system | 1.73 | x | x | x | x | x | x | x | |
| ***State Level Policy*** | | | | | | | | | |
| degree of state control of textbooks | 1.74 | x | x | x | x | x | x | x | x |
| **School Level Variables** | | | | | | | | | |
| ***School Level Demographics*** | | | | | | | | | |
| public vs. private school | 1.73 | x | x | x | x | x | x | x | x |
| level of title VII (bilingual) funding | 1.89 | x | x | x | x | x | | | |
| mix of students language backgrounds | 1.87 | | | x | x | x | | | x |
| **Student Variables** | | | | | | | | | |
| ***Student Level Demomographics*** | | | | | | | | | |
| chronological age | 1.86 | x | x | x | . | x | x | | x |
| gender | 1.41 | x | x | x | x | x | x | x | x |
| ethnicity | 1.62 | x | x | x | x | x | x | x | x |
| **Implementation, Classroom Instruction, & Climate Variables** | | | | | | | | | |
| ***Quantity of Instruction*** | | | | | | | | | |
| time spent viewing educational TV | 1.85 | x | x | x | x | x | x | | |
| ***Student and Teacher Interactions (academic)*** | | | | | | | | | |
| teacher asks questions low in difficulty | 1.77 | x | x | x | x | x | x | x | x |
| teacher asks questions low in cognitive level | 1.71 | x | x | x | x | x | x | x | x |
| ***Classroom Climate*** | | | | | | | | | |
| competition | 1.82 | x | x | x | | x | x | | x |

Note: **RER** - regular ed. researcher
**SER** - special ed. researcher
**PSY** - psychologist
**PRN** - principal
**SD** - state director
**C1D** - chapter 1 director
**RET** - regular ed. teacher
**SET** - special ed. teacher



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Another caveat applies to the content analysis of research literature on group-level effects, notably the literature on effective schools. Some of the effective schools factors have been analyzed in relation to school averages on achievement tests. Such relationships might be found somewhat larger or smaller if calculated for individual children. It can be expected that expert reviewers on this subject (on which the syntheses depend) would take this uncertainty into consideration in interpreting their findings. It has rarely been demonstrated that techniques that work for the average student have deleterious consequences for other students' learning. Nonetheless, it is worth keeping this limitation in mind in interpreting the findings and in tracing their implications.

There are many other cautions that ordinarily apply to educational research, such as the possibility that effective methods found a decade ago no longer apply today. These are obvious enough to leave to researchers and experienced educators as they think about how the findings apply in their own situations. While cognizant of the limitations of the CMOVS data base, several practical applications can be envisioned.

The following section provides an example of how the CMOVS can be used as a guiding framework to improve schools' programs.

## The Application of the CMOVS

Implications of the use of the CMOVS' to enhance communication among researchers and practitioners who make programmatic decisions and align studies on variables that are important to learning are manifold. One such application is the CMOVS' provision of a "marker" system for describing program design and implementation features (effective practices) for schools aiming to improve student learning outcomes.

As discussed in the previous section on the research base of the CMOVS, a total of 228 variables considered to be important to learning were culled from the research literature and based on consensus from the field. The variables were grouped under six major marker categories: a) state and

district variables; b) out-of-school contextual variables; c) school-level variables; d) student variables; e) program design variables; and f) implementation, classroom instruction, and climate variables. Further delineations of the six categories of marker variables resulted in 30 sub-categories. The sub-categories under each of the major categories are listed in column 1 of Table 4. For example, two sub-categories of marker variables were identified under the category of state and district variables. They are: district-level demographics and state-level policy variables. Similarly, the category of out-of-school contextual variables consists of four marker variables: community, peer group, home environment and parental support, and student use of out-of-school time variables.

The 30 sub-categories of the CMOVS can be used as a guideline for school improvement in a variety of ways. Table 5 provides an illustration of how the CMOVS can be useful to program developers, implementors, and policy makers for making informed decisions on selection of innovative practices/programs. The procedure involves systematically analyzing features of specific educational approaches/practices and assessing them in relation to needs of local schools.

Column 1 of Table 4 shows a list of 30 categories of variables that are important to learning included in the CMOVS and the anticipated outcomes of the restructured program desired by a particular user. The second column shows the specific weightings of each variable category based on the consensus from the field (Wang, Walberg, Reynolds, and Rosenfield, 1989). The "X"s listed in each program column indicate that particular variables were considered in the design of a specific approach or practice being reviewed by a user.

For example, Program B is a program designed using a teacher collaboration approach. Variables that were explicitly considered in the design of Program B under the category of State and District Variables include district level demographics variables and state level policy variables. Under the category of School Level Variables, teacher/administrator decision-making variables, school culture variables, and school-wide policy and organizational

**Table 4. Decision Making Framework: A Preliminary Analysis of the Programmatic Emphases of Selected Programs**

| Marker Variable Categories | VARIABLE WEIGHTING Based on Consensus from the Field* | Program A A Peer Collaboration Approach | Program B A Teacher Collaboration Approach | Program C A Restructured Classroom Approach | Program D A Curriculum Modification | Program E A Comprehensive, Integrated, Education and Related Service Delivery Approach |
|---|---|---|---|---|---|---|
| **I. VARIABLES CONSIDERED IMPORTANT TO LEARNING** | | | | | | |
| A. State and District Variables | | | | | | |
| 1. District Level Demographics Variables | (2) | | x | x | | x |
| 2. State Level Policy Variables | (2) | | x | | | x |
| B. Out of School Contextual Variables | | | | | | |
| 1. Community Variables | (2) | | | | | x |
| 2. Peer Group Variables | (2) | x | | | | x |
| 3. Home Environment and Parental Support Variables | (3) | | | | x | x |
| 4. Student Use of Out of School Time Variables | (2) | x | | x | | x |
| C. School Level Variables | | | | | | |
| 1. Demographic Variables | (1) | | | | | x |
| 2. Teacher/Administrator Decision Making Variables | (3) | | x | x | | x |
| 3. School Culture Variables (Ethos Conducive to Teaching and Learning) | (3) | x | x | x | | x |
| 4. School-Wide Policy and Organizational Variables | (2) | | x | x | | x |
| 5. Accessibility Variables | (2) | | | x | | x |
| 6. Parental Involvement Policy Variables | (2) | | | | | x |
| D. Student Variables | | | | | | |
| 1. Demographic Variables | (1) | | | x | | x |
| 2. History of Educational Placements | (2) | | | x | x | x |
| 3. Social and Behavioral Variables | (3) | x | | x | x | x |
| 4. Motivational and Affective Variables | (3) | x | x | x | x | x |
| 5. Cognitive Variables | (2) | x | x | x | x | x |
| 6. Metacognitive Variables | (3) | x | x | x | x | x |
| 7. Psychomotor Variables | (2) | x | x | x | x | x |
| E. Program Design Variables | | | | | | |
| 1. Demographic Variables | (2) | | | x | | x |
| 2. Curriculum and Instructional Variables | (2) | x | x | x | | x |
| 3. Curriculum Design Variables | (2) | x | | x | | x |
| F. Implementation, Classroom Instruction, and Climate Variables | | | | | | |
| 1. Classroom Implementation Support Variables | (2) | | | x | | x |
| 2. Classroom Instructional Variables | (3) | x | x | x | x | x |
| 3. Quantity of Instruction Variables | (2) | | | x | x | x |
| 4. Classroom Assessment Variables | (2) | | | x | x | x |
| 5. Classroom Management Variables | (3) | x | | x | | x |
| 6. Student and Teacher Interactions: Social Variables | (3) | x | | x | | x |
| 7. Student and Teacher Interactions: Academic Variables | (2) | x | | x | | x |
| 8. Classroom Climate Variables | (3) | x | | x | | x |
| **II. EXPECTED PROGRAM OUTCOMES** | | | | | | |
| A. Student Learning Outcomes | | x | x | x | x | x |
| B. Teacher Expertise and Attitudes | | x | x | x | x | x |
| C. Administrator/Instructional Leader Expertise and Attitudes | | | x | x | | x<br>x |
| D. Family Expectation-Attitudes | | | | | | |
| E. Program Cost Effectiveness | | x | x | x | x | x |

* Abstracted from Wang, Walberg, Reynolds and Rosenfield (1989), "Variables Important to Learning: A Consensus From the Field," Temple University Center for Research in Human Development and Education.



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**Table 5. An Illustration of Using the Decision-Making Framework to Calculate Effectiveness Index**

| Marker Variable Categories | VARIABLE WEIGHTING Based on Consensus from the Field* | IMPORTANCE RATING by the potential user | Program A A Peer Collaboration Approach | | Program B A Teacher Collaboration Approach | |
|---|---|---|---|---|---|---|
| | | | Variables emphasized in program design | EFFECTIVENESS** RATING | Variables emphasized in program design | EFFECTIVENESS* RATING |
| I. VARIABLES CONSIDERED IMPORTANT TO LEARNING | | | | | | |
| A. State and District Variables | | | | | | |
| 1. District Level Demographics Variables | (2) | 1 | 0 | 0 | x | 2 |
| 2. State Level Policy Variables | (2) | 2 | 0 | 0 | x | 4 |
| B. Out of School Contextual Variables | | | | | | |
| 1. Community Variables | (2) | 1 | | 0 | 0 | 0 |
| 2. Peer Group Variables | (2) | 2 | x | 4 | 0 | 0 |
| 3. Home Environment and Parental Support Variables | (3) | 3 | | 0 | 0 | 0 |
| 4. Student Use of Out of School Time Variables | (2) | 1 | x | 2 | 0 | 0 |
| C. School Level Variables | | | | | | |
| 1. Demographic Variables | (1) | 2 | 0 | 0 | 0 | 0 |
| 2. Teacher/Administrator Decision Making Variables | (3) | 3 | 0 | 0 | x | 9 |
| 3. School Culture Variables (Ethos Conducive to Teaching and Learning) | (3) | 3 | 0 | 0 | x | 0 |
| 4. School-Wide Policy and Organizational Variables | (2) | 3 | x | 6 | x | 6 |
| 5. Accessibility Variables | (2) | 3 | 0 | 0 | 0 | 6 |
| 6. Parental Involvement Policy Variables | (2) | 3 | 0 | 0 | 0 | 0 |
| D. Student Variables | | | | | | |
| 1. Demographic Variables | (1) | 1 | 0 | 0 | 0 | 0 |
| 2. History of Educational Placements | (2) | 1 | 0 | 0 | 0 | 0 |
| 3. Social and Behavioral Variables | (3) | 3 | x | 9 | 0 | 0 |
| 4. Motivational and Affective Variables | (2) | 2 | x | 4 | x | 4 |
| 5. Cognitive Variables | (3) | 1 | x | 3 | x | 3 |
| 6. Metacognitive Variables | (3) | 1 | x | 3 | x | 3 |
| 7. Psychomotor Variables | (2) | 1 | x | 2 | x | 2 |
| E. Program Design Variables | | | | | | |
| 1. Demographic Variables | (2) | 2 | 0 | 0 | 0 | 0 |
| 2. Curriculum and Instructional Variables | (2) | 2 | x | 4 | x | 4 |
| 3. Curriculum Design Variables | (2) | 2 | x | 4 | 0 | 0 |
| F. Implementation, Classroom Instruction, and Climate Variables | | | | | | |
| 1. Classroom Implementation Support Variables | (2) | 3 | 0 | 0 | 0 | 0 |
| 2. Classroom Instructional Variables | (3) | 3 | x | 9 | x | 0 |
| 3. Quantity of Instruction Variables | (2) | 3 | 0 | 0 | 0 | 6 |
| 4. Classroom Assessment Variables | (2) | 3 | 0 | 0 | 0 | 0 |
| 5. Classroom Management Variables | (3) | 3 | x | 9 | 0 | 0 |
| 6. Student and Teacher Interactions: Social Variables | (3) | 3 | x | 9 | 0 | 0 |
| 7. Student and Teacher Interactions: Academic Variables | (2) | 3 | x | 6 | 0 | 0 |
| 8. Classroom Climate Variables | (3) | 3 | x | 9 | 0 | 0 |
| II. EXPECTED PROGRAM OUTCOMES | | | | | | |
| A. Student Learning Outcomes | | 3 | x | 3 | x | 3 |
| B. Teacher Expertise and Attitudes | | 3 | x | 3 | x | 3 |
| C. Administrator/Instructional Leader Expertise and Attitudes | | 2 | 0 | 0 | x | 0 |
| D. Family Expectation - Attitudes | | 2 | 0 | 0 | 0 | 0 |
| E. Program Cost Effectiveness | | 2 | x | 2 | x | 2 |
| **Program Effectiveness Index** | | 79 | | 91 | | 57 |

Note: *Importance rating scale: 3 (high importance); 2 (moderate importance); 1 (low importance)
**Effectiveness Rating: **Variable Weighting x Importance Rating** for variables emphasized in a given program


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variables were considered important; but demographic variables, accessibility variables, and parental involvement policy variables were not emphasized in the design of Program B.

Based on the variables considered important (shown in Table 4), several simple quantitative indexes can be generated as a basis for making program design decisions. For example, these indexes can be used to develop an information base for identifying program development needs and/or selecting a particular approach or practice for adoption or adaptation in order to meet the improvement needs of a particular school. Examples of the variety of indices that can be generated for consideration in making programming decisions are presented below.

Program Effectiveness Index

Using the variable weightings based on the consensus from the field (shown in column 2 of Table 5), plus the information on design features emphasized in the various programs as indicated by "X"s in Table 5, potential users can develop an effectiveness index that reflects site-specific needs as they make selection judgments on given approaches or practices.

Calculating the Program Effectiveness Index. The first step in developing a Program Effectiveness Index is to calculate the importance rating by the user (potential adopter of the program/approach). This is done by asking the user to rate the importance of the variable categories listed in Column 1 of Table 5, using a three-point scale. A rating of "3" indicates that a particular variable category is considered of high importance in terms of the user's site-specific needs; a rating of "2" indicates that a particular variable category is of moderate importance; and a rating of "1" indicates that a particular variable category is of low importance. Users' ratings may be based on a variety of user-specific information (e.g., their own experiences, current programs implemented in their respective schools, knowledge of a particular set of research findings, philosophical alliances or differences on a specific instructional approach, and the importance of the variables from their own site-specific perspectives). The quantitative index derived from the potential

users' importance ratings will enable them to make decisions on the extent to which the various educational approaches and program specific practices of the various extant programs being considered meet the program improvement and implementation support needs of their respective schools/school districts.

Table 5 provides an example of how a hypothetical user can apply the CMOVS for calculating a Program /Effectiveness Index. The second column of Table 5 shows the Variable Weighting Scores (based on the three-point scale) of each of the variable categories included in the CMOVS. These scores are the result of consensus ratings from the field (Wang, Reynolds, Walberg & Rosenfield, 1989). The hypothetical user's importance rating of each of the variables included in the CMOVS are listed in Column 3 of Table 5. The number listed in the last row of column 3 is "79," the total possible Importance Score (the users' judgments on the importance or relevance of the CMOVS variables to the educational goals and/or program improvement needs of their specific schools/school districts).

As an illustration, columns 5 and 7 show the program effectiveness ratings for Program A and Program B respectively. For example, the particular hypothetical user was interested in adopting either Program A, which uses the peer collaboration approach, or Program B, which uses a teacher collaboration approach. The hypothetical user calculated Program Effectiveness Indexes for Program A and Program B based on the ratings of variable categories considered important for meeting her/his program improvement and/or implementation support needs. As shown in the last row of column 5, the program's overall Effectiveness Index for meeting the site-specific improvement needs for Program A is "91." This score is the sum of the user's Importance Ratings for each of the variable categories emphasized in the design of Program A (indicated by an "X") multiplied by the corresponding Variable Weighting Scores based on the consensus from the field (column 2). For example, the "Program Effectiveness Index" for variable category B.2 (Peer Group Variables) of Program A equals "4." The Program Effectiveness Index for variable category B.2 is derived by multiplying a Variable Weighting of "2" x an Importance Rating of "2" x "1" (the fact that this variable is emphasized in the design of Program A as indicated by an "X").

Thus, based on the overall Effectiveness Scores, as shown in Table 3, without considering other factors, Program A (with a score of "91") seems to match the particular hypothetical user's program improvement needs better than Program B (with a score of "57").

Desirability of Implementation Index

Another way of using the CMOVS for making program design decisions is to calculate a Desirability of Implementation Index for the approaches/practices being considered. Some variables may be relatively easy to incorporate in the on-going program at a given school for various reasons, (e.g., because the approach or practice being considered has already been incorporated into their programs, the staff can be quickly trained to implement the variables on a systematic basis). Other variables, however, may require extensive training, special materials, and modifications of the overall school program. Thus, the implementation of a given program or a component of a program may require special techniques or implementation support not as easily or feasibly integrated into the ongoing programs. Therefore, implementation may not be as "desirable" for a given user's specific situation. The Desirability of Implementation Index is calculated according to the user's judgement on the feasibility of implementing the program in his or her school. This is determined by using the Feasibility of Implementation Rating and the Variable Weighting based on the consensus from the field.

Calculating the Feasibility of Implementation Rating. The purpose of calculating the Feasibility of Implementation Index is to quantify the extent to which implementation of a selected approach/practice is feasible. The weighting method used in the development of the Program Effectiveness Index discussed above can also be used in calculating the feasibility of implementing an approach/practice and/or a particular component of a program. Based on a three-point scale, users first determine a Feasibility of Implementation (instead of importance) Rating by assigning a value to each variable category included in the CMOVS. A rating of "3" is given to a variable category that could be easily implemented based on the user's judgement; a rating of "2" is given to a

variable category that could be moderately implemented; and a rating of "1" is given to a variable category that could prove difficult to implement. The Feasibility of Implementation Rating Scores for each of the variable categories are listed in column 3 of Table 6.

Calculating the Desirability of Implementation Index. Once the Feasibility of Implementation Rating Scores have been calculated, they may be used to calculate the Desirability of Implementation Index for a given program. To obtain a Desirability of Implementation Index (see columns 5 and 7 of Table 6), the Feasibility of Implementation Rating for each variable considered in the design of a particular program (indicated by an "X") is multiplied by its corresponding Variable Weighting Score based on consensus from the field (column 2). By adding the Desirability of Implementation Ratings for each of the variable categories considered, the user is able to derive an overall Desirability of Implementation Score for each given program (see the last row of columns 5 and 7 in Table 6). This index essentially reflects both the consensus from the experts on variables that are important to learning and the particular program's "desirability" for implementation based on the users' best judgments of feasibility in the context of site-specific circumstances. According to Table 6, Program A, which has a Desirability Score of 101, is probably a more feasible program for the user's purposes as compared to Program B, which has a Desirability Score of 58.

## Conclusion

There are multiple ways to handle the mathematics for calculation of the various indexes. Users may design other indexes to meet their own needs. The necessary evaluation can be done by hand or by using a computer program with a built-in weighting index. Depending on the intended purpose, the user determines which index to use and how to apply the information derived from the various indexes. Appendix B includes a diagram of the schematic process for the computer analysis program, a sample of the computerized interactive decision-making program, and the results of the computer analysis of the user's ratings of a given approach/practice being considered. The printout shows a suggested list of candidate approaches/practices that include features

**Table 6. An Illustration of Using the Decision-Making Framework to Calculate Desirability of Implementation Index**

| Marker Variable Categories | VARIABLE WEIGHTING- Based on Consensus from the Field* | Feasibility of Implementation Rating | Program A A Peer Collaboration Approach | | Program B A Teacher Collaboration Approach | |
|---|---|---|---|---|---|---|
| | | | Variables emphasized in program design | DESIRABILITY** RATING | Variables emphasized in program design | DESIRABILITY* RATING |
| **I. VARIABLES CONSIDERED IMPORTANT TO LEARNING** | | | | | | |
| A. State and District Variables | | | | | | |
| 1. District Level Demographics Variables | (2) | 1 | 0 | 0 | x | 2 |
| 2. State Level Policy Variables | (2) | 3 | 0 | 0 | x | 6 |
| B. Out of School Contextual Variables | | | | | | |
| 1. Community Variables | (2) | 2 | 0 | 0 | 0 | 0 |
| 2. Peer Group Variables | (2) | 3 | x | 6 | 0 | 0 |
| 3. Home Environment and Parental Support Variables | (3) | 1 | 0 | 0 | 0 | 0 |
| 4. Student Use of Out of School Time Variables | (2) | 2 | x | 4 | 0 | 0 |
| C. School Level Variables | | | | | | |
| 1. Demographic Variables | (1) | 1 | 0 | 0 | 0 | 0 |
| 2. Teacher/Administrator Decision Making Variables | (3) | 3 | 0 | 0 | x | 9 |
| 3. School Culture Variables (Ethos Conducive to Teaching and Learning) | (3) | 2 | 0 | 0 | x | 0 |
| 4. School-Wide Policy and Organizational Variables | (2) | 1 | x | 2 | x | 2 |
| 5. Accessibility Variables | (2) | 3 | 0 | 0 | 0 | 6 |
| 6. Parental Involvement Policy Variables | (2) | 2 | 0 | 0 | 0 | 0 |
| D. Student Variables | | | | | | |
| 1. Demographic Variables | (1) | 2 | 0 | 0 | 0 | 0 |
| 2. History of Educational Placements | (2) | 1 | 0 | 0 | 0 | 0 |
| 3. Social and Behavioral Variables | (3) | 2 | x | 6 | 0 | 0 |
| 4. Motivational and Affective Variables | (2) | 3 | x | 6 | x | 6 |
| 5. Cognitive Variables | (3) | 1 | x | 3 | x | 3 |
| 6. Metacognitive Variables | (3) | 2 | x | 6 | x | 6 |
| 7. Psychomotor Variables | (2) | 3 | x | 6 | | 0 |
| E. Program Design Variables | | | | | | |
| 1. Demographic Variables | (2) | 1 | 0 | 0 | 0 | 0 |
| 2. Curriculum and Instructional Variables | (2) | 2 | x | 4 | x | 4 |
| 3. Curriculum Design Variables | (2) | 3 | x | 6 | 0 | 0 |
| F. Implementation, Classroom Instruction, and Climate Variables | | | | | | |
| 1. Classroom Implementation Support Variables | (2) | 2 | 0 | 0 | 0 | 0 |
| 2. Classroom Instructional Variables | (3) | 3 | x | 9 | x | 0 |
| 3. Quantity of Instruction Variables | (2) | 3 | x | 6 | 0 | 6 |
| 4. Classroom Assessment Variables | (2) | 2 | 0 | 0 | 0 | 0 |
| 5. Classroom Management Variables | (3) | 3 | x | 9 | 0 | 0 |
| 6. Student and Teacher Interactions: Social Variables | (3) | 2 | x | 6 | 0 | 0 |
| 7. Student and Teacher Interactions: Academic Variables | (2) | 3 | x | 6 | 0 | 0 |
| 8. Classroom Climate Variables | (3) | 3 | x | 9 | 0 | 0 |
| **II. EXPECTED PROGRAM OUTCOMES** | | | | | | |
| A. Student Learning Outcomes | | 3 | x | 3 | x | 3 |
| B. Teacher Expertise and Attitudes | | 2 | x | 2 | x | 2 |
| C. Administrator/Instructional Leader Expertise and Attitudes | | 2 | 0 | 0 | x | 2 |
| D. Family Expectation - Attitudes | | 1 | 0 | 0 | 0 | 0 |
| E. Program Cost Effectiveness | | 2 | x | 2 | x | 2 |
| **Desirability Index** | | | | 101 | | 58 |

Note: *Implementation rating scale: 3 (high importance); 2 (moderate importance); 1 (low importance)

**Stakeholder Rating: Variable Weighting x Importance Rating for variables emphasized in a given program

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that are most responsive to variables considered important to learning.

The use of the CMOVS as a decision-making framework for developing a site-specific program effectiveness and feasibility data base has several virtues. Using a quantification methodology to derive a data base for decision-making will allow the user to have multiple information resources that are systematic and specific to their information needs. Users may adopt the average ratings as calculated, or develop their own weighting schemes. They can combine this information with their best judgment of their own situations and the characteristics of the students they serve.

Although the foregoing discussion emphasizes the use of the framework by potential consumers of educational programs, it may also prove useful to curriculum designers and developers of innovative programs. The list of variables included in the CMOVS can serve as a checklist to determine which variables are critical to consider in program development and evaluation efforts. The checklist ensures that the program design incorporates features that research suggests are important to enhance learning efficiency and productivity. Thus, from the outset, consideration can be given to the variety of ways in which approaches or practices can be implemented.

If all programmatic factors were equal, it could be anticipated that the fully implemented programs which include more significant variables (features) would improve learning the most. In actual practice, however, all the factors involved are unlikely to be equal. Programs with extensive features are likely to be more costly to implement and manage. Therefore, both program developers and users need to carefully analyze the site-specific constraints and needs and weigh the trade-offs between cost and effectiveness in identifying priorities and in making programmatic decisions.

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## APPENDIX A

### Master List of Variables, Definitions and Consensus from the Field

## Variables Important To Learning: A Consensus From the Field

| Variables | Number of Variables in Each Variable Category | Number of Effective Practices (rated as important) in Each Variable Category |
|---|---|---|
| CATEGORY I: State and District Variables | | |
| A. District Level Demographics and Marker Variables | (10) | 3 |
| B. State Level Policy Variables | (6) | 3 |
| CATEGORY II: Out of School Contextual Variables | | |
| A. Community Variables | (3) | 3 |
| B. Peer Group Variables | (5) | 5 |
| C. Home Environment and Parental Support Variables | (9) | 9 |
| D. Student Use of Out of School Time Variables | (5) | 3 |
| CATEGORY III: School Level Variables | | |
| A. Demographic and Marker Variables | (8) | 3 |
| B. Teacher/Administrator Decision Making Variables | (6) | 6 |
| C. School Culture Variables (Ethos Conducive to Teaching and Learning) | (8)<br>(13) | 8 |
| D. School-Wide Policy and Organizational Variables | (1) | 11 |
| E. Accessibility Variables | (2) | 1 |
| F. Parental Involvement Policy Variables | | 2 |
| CATEGORY IV: Student Variables | | |
| A. Demographic and Marker Variables | (7) | 4 |
| B. History of Educational Placements | (3) | 3 |
| C. Social and Behavioral Variables | (5) | 5 |
| D. Motivational and Affective Variables | (9) | 9 |
| E. Cognitive Variables | (12) | 12 |
| F. Metacognitive Variables | (4) | 4 |
| G. Psychomotor Variables | (1) | 1 |
| CATEGORY V: Program Design Variables | | |
| A. Demographic and Marker Variables | (4) | 4 |
| B. Curriculum and Instructional Variables | (15) | 15 |
| C. Curriculum Design Variables | (13) | 13 |
| CATEGORY VI: Implementation, Classroom Instruction and Climate Variables | | |
| A. Classroom Implementation Support Variables | (6) | 4 |
| B. Classroom Instructional Variables | (26) | 26 |
| C. Quantity of Instruction Variables | (12) | 11 |
| D. Classroom Assessment Variables | (4) | 4 |
| E. Classroom Management Variables | (5) | 5 |
| F. Student and Teacher Interactions: Social Variables | (6) | 6 |
| G. Student and Teacher Interactions: Academic Variables | (5) | 5 |
| H. Classroom Climate Variables | (15) | 15 |



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## A Summary of Findings from
## A Survey of Consensus from the Field

| Variables | Consensus Rating |
|---|---|

Category I. State and District Variables:

These are variables associated with state and district level school governance and administration. They include state curriculum and textbook policies, testing and graduation requirements, and teacher licensure; as well as specific provisions in teacher contracts, and some district-level administrative and fiscal variables.

**I-A. District Level Demographics and Marker Variables**

| | | |
|---|---|---|
| 2. | School district size | |
| 3. | Degree of school district bureaucratization | |
| 4. | Degree of school district centralization | |
| 5. | Presence of contractual limits on after-school meetings | |
| 6. | Limits on class size | |
| 7. | Presence of contractual restrictions on activities performed by aides | |
| 8. | Degree of central office assistance and support for programs | * |
| 9. | Degree of board of education support for instructional programs | * |
| | Per pupil expenditure | * |
| | Efficiency of transportation system | |

**I-B. State Level Policy Variables**

| | | |
|---|---|---|
| 1. | | |
| 2. | Teacher licensure requirements | * |
| 3. | Degree of state control over textbooks | |
| 4. | Degree of state control over curriculum | |
| 5. | Academic course and unit requirements | * |
| 6. | Minimum competency test requirements | |
| | Adherence to least restrictive environment/mainstreaming | * |

Note: ** = highly important (mean rating of 2.6 and above, based on a 3-point scale)
* = moderately important (mean rating of 2.0 - 2.5, based on a 3-point scale)

| Variables | Consensus Rating |
|---|---|

Category II. Out of School Contextual Variables:

These are variables associated with the home and community contexts within which schools function. They include community demographics, peer culture, parental support and involvement, and amount of time students spend out-of-school on such activities as television viewing, leisure reading, and homework.

**II-A. Community Variables**

| | |
|---|---|
| 1. Socioeconomic level of community | •• |
| 2. Ethnic mix of community | • |
| 3. Quality of social services for students | • |

**II-B. Peer Group Variables**

| | |
|---|---|
| 1. Level of peers' academic aspirations | •• |
| 2. Level of peers' occupational aspirations | •• |
| 3. Presence of well defined clique structure | • |
| 4. Degree of peers' substance abuse | •• |
| 5. Degree of peers' criminal activity | •• |

**II-C. Home Environment and Parental Support Variables**

| | |
|---|---|
| 1. Educational environment (e.g., number of books and magazines at home) | •• |
| 2. Parental involvement in assuring completion of homework | •• |
| 3. Parental involvement in assuring regular school attendance | •• |
| 4. Parental monitoring of student television viewing | •• |
| 5. Parental participation in school conferences and related activities | • |
| 6. Parental application of appropriate, consistent discipline | •• |
| 7. Parental expression of attention to children | •• |
| 8. Parental interest in student's school work | •• |
| 9. Parental expectation for academic success | •• |

**II-D. Student Use of Out of School Time Variables**

| | |
|---|---|
| 1. Student participation in clubs and extracurricular school activities | |
| 2. Amount of time spent on homework | • |
| 3. Amount of time spent on leisure reading | • |
| 4. Amount of time spent viewing educational television | |
| 5. Amount of time spent viewing noneducational television | • |

| Variables | Consensus Rating |
|---|---|

Category III. School Level Variables:

These are variables associated with school-level demographics, culture, climate, policies, and practices. They include demographics of the student body, whether the school is public or private, levels of funding for specific categorical programs, school-level decision making variables, and specific school-level policies and practices, including policies on parental involvement in the school.

**III-A. Demographic and Marker Variables**

| | |
|---|---|
| 1. Public versus private school | |
| 2. Size of school | |
| 3. Level of Chapter I (compensatory education) funding | • |
| 4. Level of Title VII (bilingual) funding | |
| 5. Level of PL 94-142 (handicapped) funding | • |
| 6. Mix of socioeconomic levels in the school | • |
| 7. Mix of cultural/ethnic groups in the school | |
| 8. Mix of student language backgrounds in the school | |

**III-B. Teacher/Administrator Decision Making Variables**

| | |
|---|---|
| 1. Teacher and administrator consensus on school values, norms, and roles | •• |
| 2. Principal actively concerned with instructional program | •• |
| 3. Teacher involvement in curricular decision making | •• |
| 4. Teacher involvement in instructional decision making | •• |
| 5. Teacher involvement in resource allocation decisions | • |
| 6. Teacher involvement in finding ways to increase academic performance | •• |

**III-C. School Culture Variables (Ethos Conducive to Teaching and Learning)**

| | |
|---|---|
| 1. Use of cooperative, not exclusively competitive, goal structures | • |
| 2. School-wide emphasis on and recognition of academic achievement | •• |
| 3. Low staff absenteeism | • |
| 4. Low staff turnover | • |
| 5. Low staff alienation | •• |
| 6. Active collaboration between regular classroom teachers and special education teachers | •• |
| 7. Safe, orderly school climate | •• |
| 8. Degree of school personnel professional collaboration | •• |

| Variables | Consensus Rating |
|---|---|

Category III. School Level Variables: (continued)

**III-D. School-Wide Policy and Organizational Variables**

| | | |
|---|---|---|
| 1. | Presence of "effective schools program" | * |
| 2. | Explicit school grading and academic progress policies | * |
| 3. | Explicit school-wide discipline policy | * |
| 4. | Explicit school-wide attendance policy | * |
| 5. | Coordination of pullout programs for handicapped students with regular instructional programs | * |
| 6. | Use of multi-age grouping | |
| 7. | Use of instructional teaming | * |
| 8. | Use of cross-age tutoring | * |
| 9. | Use of peer tutoring | * |
| 10. | Use of academic tracking for specific school subject areas | * |
| 11. | Minimization of external classroom disruptions (e.g., broadcast announcements) | |
| 12. | Adherence to least restrictive environment/mainstreaming | * |
| 13. | Minimum use of suspension and expulsion as discipline tools | * |

**III-E. Accessibility Variables**

| | | |
|---|---|---|
| 1. | Accessibility of educational program (overcoming architectural, communication, and environmental barriers | * |

**III-F. Parental Involvement Policy Variables**

| | | |
|---|---|---|
| 1. | Parental involvement in improvement and operation of instructional programs | * |
| 2. | School-sponsored parenting skills workshops (e.g., behavior modification, parent effectiveness training) | * |

| Variables | Consensus Rating |
|---|---|

Category IV. Student Variables:

These are variables associated with individual students themselves, including demographics, academic history, and a variety of social, behavioral, motivational, cognitive, and affective characteristics.

**IV-A. Demographic and Marker Variables**

| | | |
|---|---|---|
| 1. | Chronological age | |
| 2. | Socioeconomic status | • |
| 3. | Gender | |
| 4. | Ethnicity | |
| 5. | First or native language | • |
| 6. | Physical and health status | • |
| 7. | Special education classifications (e.g., EMR, LD) | • |

**IV-B. History of Educational Placements**

| | | |
|---|---|---|
| 1. | Prior grade retentions | • |
| 2. | Prior special placements | • |
| 3. | Current placement in regular class versus self-contained special education class | • |

**IV-C. Social and Behavorial Variables**

| | | |
|---|---|---|
| 1. | Positive, nondisruptive behavior | •• |
| 2. | Appropriate activity level | •• |
| 3. | Cooperativeness with teacher | •• |
| 4. | Cooperativeness with peers | •• |
| 5. | Ability to make friends with peers | • |

**IV-D. Motivational and Affective Variables**

| | | |
|---|---|---|
| 1. | Attitude toward school | •• |
| 2. | Attitude toward teachers | •• |
| 3. | Attitude toward subject matter instructed | •• |
| 4. | Motivation for continual learning | •• |
| 5. | Independence as a learner | •• |
| 6. | Perseverance on learning tasks | •• |
| 7. | Self-confidence | •• |
| 8. | Academic self-competence concept in subject area instructed | •• |
| 9. | Attributions for success and failure in subject area instructed | •• |

| Variables | Consensus Rating |
|---|---|
| Category IV. Student Variables: (continued) | |
| **IV-E. Cognitive Variables** | |
| 1. Piagetian stage of cognitive development | * |
| 2. Level of reasoning (fluid ability) | ** |
| 3. Level of spatial ability | * |
| 4. Memory | ** |
| 5. Level of general academic (crystallized) knowledge | ** |
| 6. Level of specific academic knowledge in subject area instructed | * |
| 7. Level of reading comprehension ability | ** |
| 8. Level of writing ability | * |
| 9. Level of computational ability | * |
| 10. Level of oral fluency | * |
| 11. Level of listening skills | ** |
| 12. Learning styles (e.g., field independent, visual/auditory learners, high cognitive complexity) | * |
| **IV-F. Metacognitive Variables** | |
| 1. Self-regulatory, self-control strategies (e.g., control of attention) | ** |
| 2. Comprehension monitoring (planning; monitoring effectiveness of attempted actions; monitoring outcomes of actions; testing, revising, and evaluating learning strategies) | ** |
| 3. Positive strategies for coping with failure | ** |
| 4. Positive strategies to facilitate generalization of concepts | ** |
| **IV-G. Psychomotor Variables** | |
| 1. Psychomotor skills specific to area instructed | * |

| Variables | Consensus Rating |
|---|---|

Category V. Program Design Variables:

These are variables associated with instruction as designed, and with the physical arrangements for its delivery. They include the instructional strategies specified by the curriculum, and characteristics of instructional materials.

**V-A. Demographic and Marker Variables**

| | | |
|---|---|---|
| 1. | Size of instructional group (whole class, small group, one-on-one instruction) | ** |
| 2. | Proportion of students with special needs served in regular classes | * |
| 3. | Number of classroom aides required | * |
| 4. | Resources needed | * |

**V-B. Curriculum and Instructional Variables**

| | | |
|---|---|---|
| 1. | Clearly presented academic, social, and attitudinal program goals/ outcomes | ** |
| 2. | Use of explicit goal/objective setting for instruction of individual student (e.g., Individualized Educational Plans (IEPs) | * |
| 3. | Use of mastery learning techniques, including use of instructional cues, engagement, and corrective feedback | ** |
| 4. | Use of cooperative learning strategies | * |
| 5. | Use of personalized instructional program | * |
| 6. | Use of prescriptive instruction combined with aspects of informal or open education | * |
| 7. | Use of diagnostic-prescriptive methods | * |
| 8. | Use of computer-assisted instruction | * |
| 9. | Use of crisis management techniques to control classroom disruptiveness | * |
| 10. | Use of program strategies for favorable affective climate | * |
| 11. | Alignment among goals, contents, instruction, assignments and evaluation | ** |
| 12. | Curriculum units integrated around key discipline-based concepts | * |
| 13. | Use of multidisciplinary approaches to instructional planning (including diagnosis in educational planning) | * |
| 14. | Presence of information in the curriculum on individual differences and commonalities (including handicapping conditions) | * |
| 15. | Presence of culturally diverse materials in the curriculum | * |

| Variables | Consensus Rating |
|---|---|
| Category V. Program Design Variables: (continued) | |
| **V-C. Curriculum Design Variables** | |
| 1. Materials employ alternative modes of representation | * |
| 2. Material is presented in a cognitively efficient manner | ** |
| 3. Materials employ explicit and specific objectives | ** |
| 4. Materials employ advance organizers | * |
| 5. Materials employ learning hierarchies | * |
| 6. Materials are tied to assessment and diagnostic tests | * |
| 7. Availability of materials and activities prepared specifically for use with whole classroom, small groups, or one-on-one instruction | * |
| 8. Degree of structure in curriculum accommodates needs of different learners | ** |
| 9. Student interests guide selection of a significant portion of content | * |
| 10. Availability of materials and activities for students with different abilities | ** |
| 11. Availability of materials and activities for students with different learning styles | ** |
| 12. Developmental issues considered | * |
| 13. Student experiences considered | * |

| Variables | Consensus Rating |
|---|---|
| Category VI. Implementation, Classroom Instruction, and Climate Variables: These are variables associated with the implementation of the curriculum and the instructional program. They include classroom routines and practices, characteristics of instruction as delivered, classroom management, monitoring of student progress, and quality and quantity of instruction provided, as well as student-teacher interactions and classroom climate. | |
| **VI-A Classroom Implementation Support Variables** | |
| 1. Creation and maintenance of necessary instructional materials | * |
| 2. Adequacy in the configuration of classroom space | * |
| 3. Availability of classroom aides | * |
| 4. Use of written records to monitor student progress | |
| 5. Establishing efficient classroom routines and communicating rules and procedures | |
| 6. Developing student self-responsibility for independent study and planning of one's own learning activities | ** |
| **VI-B Classroom Instructional Variables** | |
| 1. Prescribing individualized instruction based on perceived match of type of learning tasks to student characteristics (e.g., ability, learning style) | * |
| 2. Use of procedures requiring rehearsal and elaboration of new concepts | * |
| 3. Use of clear and organized direct instruction | ** |
| 4. Systematic sequencing of instructional events and activities | ** |
| 5. Explicit reliance on individualized educational plans (IEPs) in planning day-to-day instruction for individual students | * |
| 6. Use of instruction to surface and confront student misconceptions | * |
| 7. Use of advance organizers, overviews, and reviews of obejctives to structure information | * |
| 8. Clear signaling of transitions as the lesson progresses | * |
| 9. Significant redundancy in presentation of content | * |
| 10. Teacher conveys enthusiasm about the content | ** |
| 11. Directing students' attention to the content | ** |
| 12. Using reinforcement contingencies | ** |
| 13. Setting and maintaining clear expectations of content mastery | ** |
| 14. Providing frequent feedback to students about their performance | ** |
| 15. Explicitly promoting effective metacognitive learning strategies | * |
| 16. Promoting learning through student collaboration (e.g., peer tutoring, group work) | * |
| 17. Corrective feedback in event of student error | ** |
| 18. Flexible grouping that enables students to work to improve and change status/groups | ** |
| 19. Teaching for meaningful understanding | ** |
| 20. Degree to which student inquiry is fostered | ** |
| 21. Scaffolding and gradual transfer of responsibility from teacher to student | * |
| 22. Degree to which assessment is linked with instruction | * |
| 23. Skills taught within the context of meaningful application | ** |
| 24. Good examples and analogies to concretize the abstract and familiarize the storage | ** |
| 25. Consideration of the teacher's use of language in the instructional process | ** |
| 26. Explicitly promoting student self-monitoring of comprehension | ** |



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| Variables | Consensus Rating |
|---|---|
| Category VI. Implementation, Classroom Instruction, and Climate Variables: (continued) | |
| **VI-C. Quantity of Instruction Variables** | |
| 1. Length of school year | * |
| 2. Length of school day | ** |
| 3. Time on task (amount of time students are actively engaged in learning) | ** |
| 4. Time spent in direct instruction on basic skills in reading | ** |
| 5. Time spent in direct instruction on basic skills in mathematics | ** |
| 6. Time allocated to basic skills instruction by regular classroom teacher | ** |
| 7. Time allocated to basic skills instruction by special education teacher | * |
| 8. Difference between academic learning time and allocated learning time | * |
| 9. Time spent out of school on homework | * |
| 10. Time spent out of school viewing educational television | * |
| 11. Time spent out of school in informal learning experiences (e.g., museum trips, scouts) | * |
| 12. Nature of regular classroom content missed by students during participation in pullout programs | |
| **VI-D. Classroom Assessment Variables** | |
| 1. Use of assessments to create detailed learner profiles rather than simple classifications or unlaborated total scores | * |
| 2. Use of assessment as a frequent, integral component of instruction | * |
| 3. Accurate, frequent measurement of basic skills in reading | * |
| 4. Accurate, frequent measurement of basic skills in mathematics | * |
| **VI-E. Classroom Management Variables** | |
| 1. Minimal disruptiveness in classroom (e.g., no excessive noise, no students out of place during instructional activities, no destructive activities) | ** |
| 2. Group alerting (teaching uses questioning/recitation strategies that maintain active participation by all students) | ** |
| 3. Learner accountability (teacher maintains student awareness of learning goals and expectations) | ** |
| 4. Transitions (teacher avoids disruptions of learning activities, brings activities to a clear and natural close, and smoothly initiates new activity) | ** |
| 5. Teacher "withitness" (teacher is continually aware of events and activities and minimizes disruptiveness by timely and nonconfrontational actions) | ** |

| Variables | Consensus Rating |
|---|---|

Category VI. Implementation, Classroom Instruction, and Climate Variables: (continued)

**VI-F. Student and Teacher Interactions: Social Variables**

| | |
|---|---|
| 1. Student initiates positive verbal interactions with other students and with teacher | • |
| 2. Student responds positively to questions from other students and from teacher | •• |
| 3. Teacher reacts appropriately to correct and incorrect answers | •• |
| 4. Teacher reinforces positive social interactions with students rejected by peers | •• |
| 5. Teacher provides explicit coaching on appropriate social behaviors | •• |
| 6. Teacher provides explicit coaching to reduce aggression | •• |

**VI-G. Student and Teacher Interactions: Academic Variables**

| | |
|---|---|
| 1. Teacher asks academic questions frequently | •• |
| 2. Teacher asks questions predominantly low in difficulty | • |
| 3. Teacher asks questions that are predominantly low in cognitive level | • |
| 4. Teacher maintains high post-question wait time | • |
| 5. Frequent calls for extended, substantive oral and written response (not one-word answers) | • |

**VI-H. Classroom Climate Variables**

| | |
|---|---|
| 1. Cohesiveness (members of class are friends sharing common interests and values and emphasizing cooperative goals) | • |
| 2. Low friction (students and teacher interact in a considerate and cooperative way, with minimal abrasiveness) | •• |
| 3. Low cliqueness (students work with many different classmates, and not just with a few close friends) | • |
| 4. Satisfaction (students are satisfied with class activities) | •• |
| 5. Speed (the pacing of instruction is appropriate for the majority of the students) | •• |
| 6. Task difficulty (students are continually and appropriately challenged) | •• |
| 7. Low apathy (class members are concerned and interested in what goes on in the class) | •• |
| 8. Low favoritism (all students are treated equally well in the class, and given equal opportunities to participate) | •• |
| 9. Formality (students are asked to follow explicitly stated rules concerning classroom conduct and activities) | • |
| 10. Goal direction (objectives of learning activities are specific and explicit) | •• |
| 11. Democracy (all students are explicitly involved in making some types of classroom decisions) | • |
| 12. Organization (class is well organized and well planned) | •• |
| 13. Diversity (the class divides its efforts among several different purposes) | • |
| 14. Environment (needed or desired books and equipment are readily available to students in the classroom) | •• |
| 15. Competition (students compete to see who can do the best work) | • |

## APPENDIX B

**CMOVS Computer Analysis:**
**User Ratings of Selected, Innovative Educational Practices**

A Flow Diagram of the CMOVS Computer Program



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## Sample Screens From the Computerized Interactive Decision-Making Program

Screen #1

In this computer application, you will be asked to rate the importance and feasibility of 30 variables according to your site-specific circumstances. This will enable you to calculate specific indexes to help you in your programmatic decision-making.

HIT RETURN TO CONTINUE

Screen #2

To begin, rate the importance of the following State and District Variables by typing a 0, 1, 2, or 3.

HIT RETURN TO CONTINUE

Screen #3

1. District Level and Demographic Variables

(not sure) ( not important) (somewhat important) (very important)

HIT RETURN TO CONTINUE

Screen #4

2. State Level Policy Variables

(not sure) ( not important) (somewhat important) (very important)

HIT RETURN TO CONTINUE

**CMOVS Computer Analysis:**
**User's Effectiveness, Feasibility, and Desirability Ratings of Approaches/Practices**

## EFFECTIVENESS RATING

The following innovative educational approaches/practices are recommended in order of their effectiveness from the highest to the lowest according to the user's ratings:

Using a comprehensive & integrated approach to service delivery
score ---------- 146

Using a restructured classroom approach
score ---------- 120

Using a peer collaboration approach
score ---------- 86

Using a teacher collaboration approach
score ---------- 62

Using a curriculum modification approach
score ---------- 58

## FEASIBILITY RATING

The following innovative educational approaches/practices are recommended in order of their feasibility from the highest to the lowest according to the user's ratings:

Using a comprehensive & integrated approach to service delivery
score ---------- 146

Using a restructured classroom approach
score ---------- 120

Using a peer collaboration approach
score ---------- 86

Using a teacher collaboration approach
score ---------- 62

Using a curriculum modification approach
score ---------- 58

## DESIRABILITY RATING

The following innovative educational approaches/practices are recommended in order of their desirability from the highest to the lowest according to the user's ratings:

Using a comprehensive & integrated approach to service delivery
score ---------- 676

Using a restructured classroom approach
score ---------- 568

Using a peer collaboration approach
score ---------- 428

Using a teacher collaboration approach
score ---------- 292

Using a curriculum modification approach
score ---------- 276


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